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STUDIES IN NEOTROPICAL MALLOPHAGA, XVII: A NEW FAMILY (TROCHILIPHAGIDAE) AND A NEW GENUS OF THE LICE OF HUMMINGBIRDS

By M. A. Carriker, Jr.

I wish to express my thanks to Dr. J. F. Gates Clarke and other members of the Division of Entomology of the U.S. National Museum for having reviewed a preliminary draft of parts of the present paper. My thanks are also due to Colonel K. C. Emerson for the loan of material and other assistance. All measurements are in millimeters. I drew all illustrations accurately to scale by means of an eye-piece micrometer with a No. 10 eye piece, Nos. 16 and 4 objectives.

On the basis of the nomenclature now currently applied to the Mallophaga of the Trochilidae, two genera of the suborder Amblycera are normally but not abundantly found on the Trochilidae: *Trochiloecetes* and *Ricinus*. The former are known only from the Trochilidae, but the latter are common parasites of many species of passerine birds. Any other genus of Mallophaga which may have been recorded from the hummingbirds are patently stragglers and should be disregarded.

The genus *Trochiloecetes* is the more abundant of the two. I have specimens of it from 32 species of hosts ranging from Mexico to Bolivia, whereas I have taken *Ricinus*-like forms from only 20 species of hosts. Only 4 species of hummingbirds have yielded both genera of lice, and only once have both genera been taken on the

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same individual host. Specimens of the males of both genera are extremely rare. There are in my collection only 7 species of *Trochiloecetes* represented by males, and only 1 species of the *Ricinus*-like form, it being represented by two males (from *Selasphorus flammula*).

Generally speaking, *Trochiloecetes* and *Ricinus* are not strikingly different in appearance, except in the shape of the head and prothorax, and in the male genitalia. In overall appearance the species of *Ricinus* which parasitize the hummingbirds resemble closely a few species of the genus found on other families of hosts. The mouth parts, however, are entirely different and resemble those of *Trochiloecetes*.

The first species of *Trochiloecetes* to be described was *prominens*, under the old generic term of *Physostomum*, from *Calypte costae*. In 1903 *doratophorus* was described by the present author from *Selasphorus flammula*. In 1913 Paine and Mann described a third species, *emiliae*, and placed it in the new genus *Trochiloecetes*. They designated *Physostomum prominens* Kellogg and Chapman the type of this new genus. A fourth species, *ochoterenai*, was described by Zavaleta in 1943, from *Selasphorus rufus* of Mexico, but the status of this species is in doubt, as will be explained below.

Meanwhile, none of the various authors who had worked with the genus seem to have noted that the mouth parts were entirely different from those of all other Mallophaga. In 1949 Clay published a short article which briefly described the differences and showed that the mandibles are not of the ordinary chewing type, but of a piercing character.[1] This condition would seem to be ample proof that this insect feeds on blood instead of feathers and scales of skin; however, the theory was further substantiated by the presence of a long, slender tube lying between the mandibles, the tube apparently used for sucking blood from the punctures or scarifications made by the pointed mandibles (see fig. 1*a*). Clay has elaborated somewhat on the details of these structures and has advanced theories as to their origin.

As stated above, the species of *Ricinus* (auct.) found on the Trochilidae possess mouth parts similar to those of *Trochiloecetes* (see fig. 1*f*), but quite different from those of the species of *Ricinus* (auct.) found on other families of birds. These mouth parts are of a somewhat different type than those of other genera of Amblycera, the differences being in the type of articulation and in the absence of "teeth" on the inner side of the mandibles in *Ricinus*.

Some forms of *Ricinus* (auct.) have mandibles that are exceedingly minute (*Dysthamnus mentalis*, fig. 1*b*), but not more so than in some other genera of Amblycera, and others (*Phlegopsis n. nigromaculatus*,

[1] Nature, vol. 164, p. 617, Oct. 8, 1949.

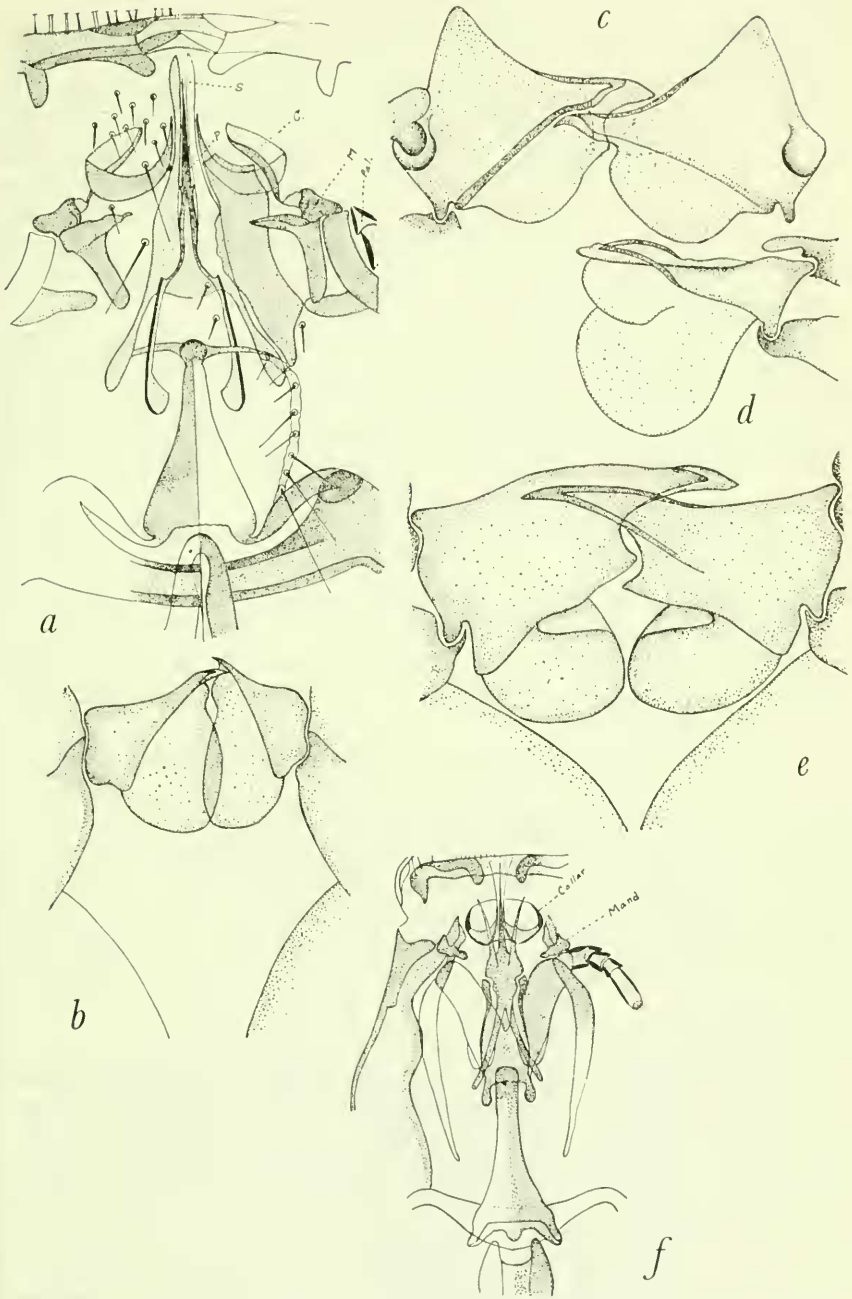

FIGURE 1.—*a*, *f*, Mouth parts and supporting framework of: *a*, *Trochilocoetes sauli*; *f*, *Trociliphagus lazulus*. *b–e*, Mandibles of *Ricinus* sp. from: *b*, *Dysthamnus mentalis cumbreanus*; *c*, *Phlegopsis n. nigromaculatus*; *d*, *Myiospiza aurifrons*; *e*, *R. subangulatus* (Carriker), from *Thraupis virens diaconus*. *Abbreviations: p, stylet; s, sheath; c, collar; m, mandible, pal, palpi.*

fig. 1*c* and *Thraupis virens episcopus*, fig. 1*e*) have fairly large mandibles, but none possess the serrated inner surfaces.

In *Trochiloecetes* the mandibles are without visible condyles. The anterior portion, at the angle of the "L," is fused with a small projection on the inner side of the marginal carina, just in front of the palpi. The long, posterior tip seems to be without support; it moves transversely along a short band projecting from the premarginal nodus, but it probably has a muscular attachment to the band, a condition that would allow a forward and backward movement of the pointed, anterior portion of the "L."

In species of *Ricinus* (auct.) the mandibular condyles differ greatly in the amount of their development. Those from *Phlegopsis* have well developed articulations (see fig. 1*c*), especially of the anterior condyle, while those from *Dysthamnus* (typical of the small mandible type) have the articulation rudimentary, but nevertheless present.

In all the species of *Trochiloecetes* that I have examined there is a great similarity in the shape and situation of the mandibles, as may be seen from the figures of the species described on succeeding pages.

Although Clay asserts that the tip of the left mandible is bipartite, I have not been able to confirm this statement. It is true that the tip of the left mandible in *Ricinus* (auct.) is bipartite, but apparently it is not in *Trochiloecetes*.

Clay states further: "There are three closely associated stylet-like structures, almost certainly of hypopharyngeal origin, which are joined by a common membrane, only the distal ends being free." Actually, the median stylet is the sucking tube, while the two lateral ones form the sheath that supports and shields it. This structure is not always clearly visible, but in some specimens all details are clearly defined. There is considerable variation in the details of these structures, but generally speaking the same pattern is found throughout the genus.

Clay mentions the outgrowths from the dorsal wall of the preoral cavity as forming a groove to hold and guide the hypopharyngeal apparatus, but this is slightly misleading. These outgrowths are the anchorages to which are fused the sides of the collarlike structure, and it is through this structure that the hypopharyngeal apparatus is protruded and retracted. Clay also states: "The mandibles are lightly sclerotized and the piercing blades lie parallel to the median structure." The long, posterior portion of the mandibles does lie parallel to the sucking apparatus, but the actual piercing blades are at the anterior end, pointing inward, at right angles to the median structure. The mandibles are L-shaped, the long arm pointing backward and the short, piercing blade pointing inward.

Undoubtedly the genus *Ricinus* is the progenitor of the abnormal, *Ricinus*-like form found on the Trochilidae, as well as the more dissimilar *Trochiloecetes*, since both of these forms are unquestionably blood-sucking parasites and hence degenerates. Further support for this theory is found in the presence of *Ricinus* on such a large and varied number of hosts, while the blood-sucking degenerates are found only on the Trochilidae.

In my own collection I have specimens of *Ricinus* from 16 passerine families embracing 101 genera and 136 species. Three records from nonpasserine hosts have been discarded as being probable stragglers.

The original *Ricinus*-like form must have been parasitic on the progenitor of the hummingbirds at a very early stage of its existence, and, not finding their type of feathers suitable food, must have gradually developed the present type of piercing mandibles and the very complicated sucking apparatus, an evolutionary process which must have been extremely slow.

Such a difference in the most basic anatomical character of these insects certainly entitles the group to special nomenclatural distinction. I therefore propose a new family for the two groups parasitic on the Trochilidae, viz., the genus *Trichiloecetes* and those species which are now called (incorrectly) *Ricinus* but which should be given generic distinction.

Suborder Amblycera Kellogg, 1896

Family Trochiliphagidae, new family

Type genus: *Trochiloecetes* Paine and Mann.

The outstanding characters of this family are the minute, more or less fixed, piercing or scarifying mandibles and the complicated sucking apparatus lying between them. The mandibles of *Trochiloecetes* are L-shaped, with their attachment at the angle of the L, the short piercing arm pointing inward and the long arm backward (for further details see under the genus, below).

The mandibles of the new genus, *Trochiliphagus* are minute, roughly cone-shaped, with irregular outline and usually blunt points and with bases fused to the nodi, to which are attached the palpi (see also fig. 2).

The sucking apparatus is supported by a very complicated framework, differing considerably from species to species. The sucking portion consists of a needlelike tube, tapering slightly to a slender point and lying within a sheath open at the apical end. The sheath is composed of two portions separated distally and ending in very slender tips, so that there seems to be three stylets.

The sucking apparatus bears a certain resemblance to that found in Anoplura. In the new family, however, the sucking apparatus lies completely within the head, is accompanied by a pair of piercing

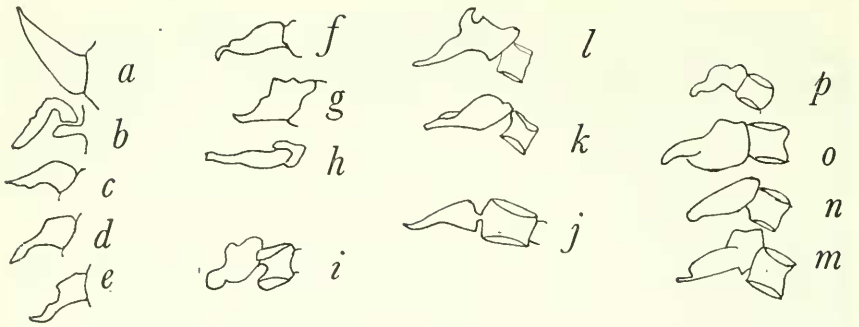

FIGURE 2.—Right hand mandible of 16 species of *Trochilophagus: a*, species not described from *Haplophoedia a. aurelia; b*, species not described from *Aglaiocercus kingi mocoa; c*, *T. irazuensisus; d*, *T. mexicanus; e*, *T. latitemporalis; f*, species not described from *Leucippus fallax cervina; g*, *T. brevicephalus; h*, *T. oenonae; i*, species not described from *Amazilia fimbriata nigricauda; j*, species not described from *Amazilia lactea bartletti; k*, *T. abdominalis; l*, *T. peruanus; m*, *T. mellivorus; n*, species not described from *Lepidopyga luminosa; o*, species not described from *Thalurania furcata jelskii; p*, *T. multicarinae.*

mandibles, and is entirely retractile (see fig. 1*a* showing muscular attachments). The oesophageal sclerite and accompanying glands are absent.

Genus *Trochiloecetes* Paine and Mann, 1913

Trochiloecetes Paine and Mann, Psyche, vol. 20, p. 21, 1913.

Type species: *Physostomum prominens* Kellogg and Chapman, 1899.

Key to the Species of *Trochiloecetes*

MALES

Body length 1.60 or less . . . . . Section A
Body length 1.70 to 1.80 . . . . . Section B
Body length more than 1.90 . . . . . Section C

SECTION A

a. Sides of frons angulated; sides of temples slightly convex and with eye prominent; occipital margin strongly sinuate; prothorax not extending under the head and with posterior margin flatly rounded; frontal carina wide medially, with large, circular aperture; abdominal submarginal carinae narrow, with prominent articulations . . . . . **aglaeacti**

a'. Sides of frons rounded; frontal carina narrow and with small aperture; sides of temples strongly convex; eye not prominent; occipital margin uniformly concave, with slight median angle; prothorax extending far under occiput; abdominal submarginal carinae wide, with articulations scarcely swollen. **quibdoensis**

SECTION B

a. Frons concave.

b. Frons narrow (0.30); temples angulated at eye; occipital margin strongly sinuate; submarginal transverse carina across frontal region faintly pigmented, as well as preantennary carinae; temples with posterior portion

bluntly angulated; prothorax extending under head; body 1.72; head 0.47×0.50 . . . . . **coartatia**

b'. Frons broad (0.37); submarginal transverse carina of front largely pitchy black, as well as posterior portion of preantennal carinae; temples uniformly rounded; sides of prothorax extending far under head in form of lateral black points; body 1.78; head 0.50×0.55 . . . . . **malvasae**

a'. Frons transverse.

b. A concave, submarginal line across frons, with area between it and margin hyaline; sides of temples uniformly convex; sides of pterothorax almost straight; prominent median and lateral sternites in pterothorax (see fig. 3*f*); body 1.74; head 0.49×0.53 . . . . . **simplex**

b'. Frontal area uniformly colored; sides of temples with angulation at eye; sides of pterothorax strongly convex, with no visible sternal plates; length 1.70; head 0.48×0.55 . . . . . **latitemporis**

SECTION C

a. Body length 1.97.

b. Frons wide (0.40) and deeply concave; head 0.52×0.63; temples strongly convex, with prominent eye; occipital margin sinuate, angulated medially; prothorax large and extending under occiput, and with prominent pitchy black lateral, submarginal carinae; prominent median prosternal plate and lateral metasternal sclerites . . . . . **grandior**

b'. Frons narrow (0.33), with uniformly rounded sides and slightly concave anterior margin; head 0.49×0.55; prothorax small (0.29×0.43); pterothorax small, with straight sides; lateral carinae broken and mostly submarginal . . . . . **rhodopis**

a'. Body length 2.27. Frons faintly concave; eye prominent; sides of temples with irregular margin; numerous short, spinelike setae on head, prothorax, and legs; head 0.60×0.65 . . . . . **columbianus**

FEMALES

Body length less than 2.00 (1.80 to 1.95) . . . . . Section A
Body length more than 2.05 (2.08 to 2.25) . . . . . Section B
Body length more than 2.35 (2.37 to 2.57) . . . . . Section C

SECTION A

a. Frons slightly concave and wide (0.34), with sides only slightly convex; sucking apparatus very slender, with both basal prongs and main stylet, also very long (0.24); length 1.82; head 0.49×0.56 . . . . . **coartatia**

a'. Frons transverse and narrow (0.15), with sides strongly divergent to ends of submarginal, transverse carina, where it is 0.29 wide; stylet of sucking apparatus extremely slender, with basal portion thickened, and total length only 0.20 . . . . . **angustifrons** and **prominens**

SECTION B

a. Frons noticeably concave.

b. Sides of frons bluntly angulated.

c. Occipital margin angulated medially; sucking apparatus with apical half very slender and basal portion much thickened; prosternum long, extending under head; a large, entire, prosternal plate in posterior portion of segment; piercing points of mandibles short. Length 2.25; head 0.57×0.68; frons 0.43 . . . . . **grandior**

c'. Occipital margin not angulated medially; sucking apparatus thickened, with only short tip slender and with basal prongs bifurcated; prosternum short, not reaching to occiput; a large median pterothoracic sternite of more or less horse-shoe shape; abdomen very large (1.19×1.06) . . . . . **abdominalis**

b'. Sides of frons strongly rounded; temples expanded laterally; occipital margin strongly sinuate; sucking apparatus slender, tapering from base to tip and with basal prongs very slender but widening distally.

c. Head larger (0.57×0.63); eye obsolete; propulsion sclerite short and thickened; prosternum short, with sides uniformly convex; pterothorax short (0.37), with sides constricted medially; numerous short, stout setae on legs . . . . . **pinguis**

c'. Head small (0.55×0.61); eye prominent; propulsion sclerite long and slender; prosternum long, with sides constricted medially; pterothorax long (0.43), with sides strongly and uniformly convex. **doratophorum**

a'. Frons transverse, or almost so.

b. Anterior portion of head, anterior to transverse carina, more or less uniformly colored, with no concave line across front (see (fig. 8*a*); eye prominent.

c. Frons narrow, not more than 0.32; sucking apparatus long and very slender, with slender supporting filaments from sides of basal prongs extending almost to tip of stylet; no sternal setae in gular area.

d. Temples wide (0.58), strongly swollen laterally; occipital margin strongly sinuate; head 0.03 longer at occiput than at temples; prothorax not extending under head . . . . . **complexus**

d'. Temples narrow (0.54), very slightly swollen laterally, and with a slight constriction at eye; prothorax extending far under head; occipital margin less sinuate; less than 0.01 difference between length of head at temples and occiput . . . . . **bolivianus**

c'. Frons wide (0.34 to 0.35); sucking apparatus short and heavy, especially posterior half; a row of 4 to 5 short setae on each side of gular area; prothorax scarcely extending beneath head.

d. Heavy, deeply colored temporal carinae, curving backward from in front of eye almost to prosternum, where they are fused to base of sclerite which extends to basal prongs of sucking apparatus (see fig. 8*a*) . . . . . **fasciatus**

d'. No temporal carinae, merely marginal carinae, broken by eye. **oenonae**

b'. Anterior portion of head, in front of transverse carina, with a strongly concave line across frons, the area in front of which is almost hyaline, behind it strongly pigmented (see fig. 3*f*); median mesothoracic and lateral metathoracic sternites; temples uniformly convex; eye obsolete; length 2.25; head 0.49×0.53; frons 0.33 . . . . . **simplex**

SECTION C

a. Frons deeply concave, with rounded lateral angles and without submarginal, concave transverse line; line of five setae on each side of gular area.

b. Size large, body 2.54; head 0.61×0.63; frons 0.44; transverse carina wide, deeply colored and extending to lateral margins of head; prominent submarginal, transverse, sinuate, occipital carina, deeply colored; heavy lateral, submarginal carinae on prothorax and heavy marginal carinae on pterothorax; mandibles short and thickened; joints of submarginal, abdominal carinae scarcely swollen . . . . . **multicarinae**

b'. Size small. Body 2.44; head short and wide (0.55×0.65); frons 0.43. Transverse frontal carina slender and composed of two narrow bands not reaching to lateral margins of head; no submarginal transverse carina across occipital region; carinae of prothorax and pterothorax more slender; mandibles longer, less thickened; joints of lateral, abdominal carinae much swollen . . . . . **illumani**

a'. Frons very slightly concave, not transverse, with rounded sides.

b. Area anterior to transverse carina of frons more or less uniformly colored, without submarginal concave line, sides of temples with strongly irregular margins; eye prominent.

c. Size large, body more than 2.50 (body 2.57; head 0.60×0.67; frons 0.46). A heavy, submarginal, strongly sinuate carina across occiput; extensile muscles that push forward the sucking apparatus are longer; head longer at temples than at occiput; pterothorax longer (0.78), with straight, slightly undulating sides; sucking apparatus very heavy, with short slender tip . . . . . **sauli**

c'. No submarginal occipital carina; sucking apparatus long and slender, with long, slender basal prongs; propulsion sclerite also long and slender; numerous short, stout, pustulated setae scattered over head, pterothorax, and legs; pterothorax short (0.35×0.78) and with sides uniformly convex . . . . . **columbianus**

b'. A submarginal, concave line across frons, with area anterior to it almost hyaline. Head short and wide, with shorter body (2.37); head 0.53×0.64; frons 0.42; temples strongly expanded laterally, line of margins broken at prominent eye; sucking apparatus heavy basally, with thickened basal prongs; propulsion sclerite short and thickened; sides of pterothorax slightly concave medially . . . . **mandibularis**

Trochiloecetes prominens (Kellogg and Chapman), 1899

Physostomum prominens Kellogg and Chapman, Occ. Pap. California Acad. Sci., vol. 6, p. 137, pl. 9, fig. 5, 1899. Host: *Calypte costae* (Bourcier).

With a transverse frons and length of 2.00, this species falls in the key between sections A and B, and could be included in either. Placed under section A, it would go with *angustifrons* under *a'*, but it differs decidedly from that species in the much wider frons, the sides of which are rounded, not divergent; temples moderately convex laterally, occiput only slightly sinuate. I have examined the type, which is almost adult, but recently molted. The authors attribute the fading out of the submarginal, abdominal carinae posteriorly to immaturity, but this assumption is incorrect, the fading out being a universal character.

Trochiloecetes doratophorus (Carriker), 1903

Physostomum doratophorum Carriker, Univ. Nebraska Studies, vol. 3, p. 165, pl. 5, fig. 4, 1903. Host: *Selasphorus flammula* Salvin.

There is little to be added to the original description. The frons is concave; eye prominent; sides of temples strongly convex; stylet

of sucking apparatus, with basal support, measures 0.26; head at temples 0.52×0.61; frons 0.40. The type, a female, is in the collection of the author; also 1 ♀ paratype. When this species was described, the author remarked that it was being provisionally placed in the genus *Physostomum*, since a closely related species (*prominens*) had been placed there by Dr. Kellogg, but in the opinion of the author, further collecting from hummingbirds would produce additional species upon which a new genus could be safely erected. Ten years later this new genus was described by Paine and Mann.

Trochiloecetes emiliae Paine and Mann, 1913

Trochiloecetes emiliae Paine and Mann, Psyche, vol. 20, p. 21, fig. 5, 1913. Host: *Thalurania* (*furcata*) *furcatoides* Gould.

Without seeing the type it is difficult to place this species in the key. However, it falls into Section B, *c'*, with *doratophorum*, but has a smaller head than this species (0.52×0.56 against 0.55×0.61). The head is longer at the occiput than at the temples; the transverse frontal carina is very short (if the figure given is correct); it falls far short of the lateral margins of the head (a very unusual condition if true). The author gives incorrect measurements for *doratophorum*, perhaps because he compared *emiliae* with some species wrongly identified as that form.

Trochiloecetes ochoterenai Zavaleta, 1943

Trochiloecetes ochoternai Zavaleta, Tesis Univ. Mexico, Fac. Sci., Dept. Biol., p. 54, pl. 5, fig. c, 1943. Host: *Selasphorus rufus* (Gmelin).

I have been unable to secure a copy of the description of this species. Colonel Emerson sent me from its host a pair of specimens that he supposed were the *Trochiloecetes* in question, but unfortunately they proved to be species of the *Ricinus*-like genus described on succeeding pages of this paper. It is not impossible that both *Trochiloecetes* and *Trochilophagus* (the new genus) would be found on the same host, since I have them both from *Selasphorus flammula*. Until further information can be secured concerning the species, it may be provisionally left in *Trochiloecetes*.

Trochiloecetes aglaeacti, new species

FIGURE 3,*a–b*

Type, male adult, from *Aglaeactis c. cupripennis* (Bourcier), collected by the author at Malvasá, Dep. Cauca, Colombia, Jan. 22, 1957, in the collection of the author. Represented by a single ♂, the holotype.

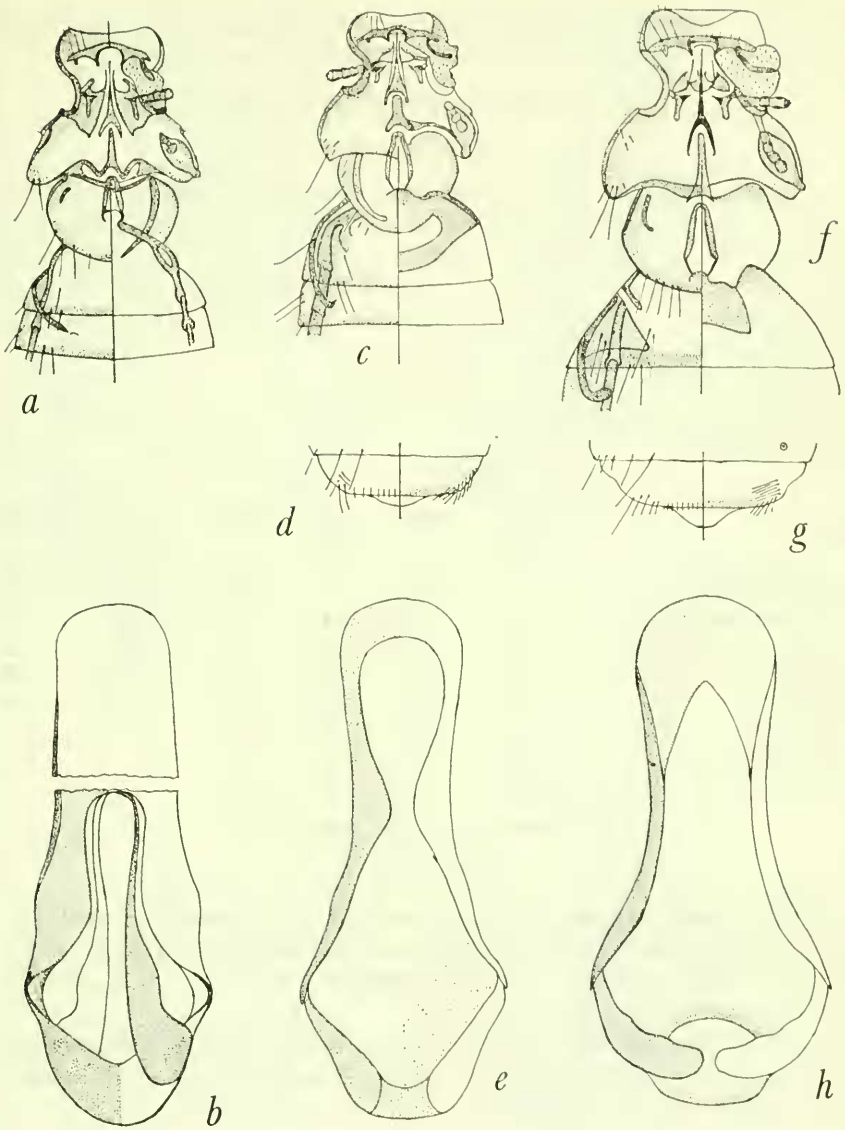

FIGURE 3.—*a–b*, *Trochiloecetes aglaiacti* ♂: *a*, head, thorax, and abdominal segment I; *b*, genitalia. *c–e*, *T. quibdoensis* ♂: *c*, head, thorax, and abdominal segment I; *d*, tip of abdomen; *e*, genitalia. *f–h*, *T. simplex: f*, ♀, *head and thorax; g*, ♀, tip of abdomen; *h*, ♂, genitalia.

The distinguishing characters for the species may be found in the preceding key. Measurements follow the next species.

***Trochiloecetes quibdoensis*, new species**

FIGURE 3,*c–e*

Types, male and female adults, from *Amazilia t. tzactl* (de la Llave), collected by the author at Quibdó, Dep. Chocó, Colombia, Mar. 11, 1918, in the collection of the author. The species is represented by the ♂ holotype, ♀ allotype, 1 ♂ and 1 ♀ paratypes, and 1 ♀ from the type host collected by the author at Villa Felisa, Dep. Norte de Santander, Colombia, Nov. 1, 1947.

For descriptive characters, see the key.

The measurements (in mm.) of *T. aglaeacti* and *T. quibdoensis* are as follows:

	T. aglaeacti		*T. quibdoensis*			
	Male		*Male*		*Female*	
	Length	*Width*	*Length*	*Width*	*Length*	*Width*
Body	1. 56	--	1. 57	--	1. 95	--
Head: frons	--	0. 30	--	0. 30	--	0. 33
Head: temples	. 45	. 50	. 44	. 47	. 51	. 52
Head: occiput	. 45	--	. 42	--	. 52	--
Prothorax	. 25	. 35	. 27	. 33	. 26	. 42
Pterothorax	. 28	. 52	. 28	. 49	. 25	. 67
Abdomen	. 76	. 63	. 76	. 67	1. 08	. 85
Basal plate	. 34	. 09	. 30	. 09		
Parameres	. 07	. 11	--	--		
Endomeral sac	. 09	. 13	. 08	. 14		

***Trochiloecetes simplex*, new species**

FIGURE 3,*f–h*

Types, male and female adults, from *Amazilia amazilia caeruleigularis* Carriker, collected by the author at Nazca, Peru, Mar. 28, 1931, in the collection of the author. Represented by the ♂ holotype, ♀ allotype, and 3 ♀ paratypes.

Distinguished by the transverse frons, with a concave, submarginal line across front, with area between it and margin hyaline. Measurements follow the next species.

***Trochiloecetes latitemporis*, new species**

FIGURE 4,*a–b*

Type, male adult, from *Colibri c. coruscans* (Gould), collected by the author at Buenos Aires, Dep. Norte de Santander, Colombia, Sept. 16, 1945, in the collection of the author. Species represented by ♂ holotype only.

Similar to the preceding species except that the frontal area is uniformly colored, with no submarginal, concave line crossing it.

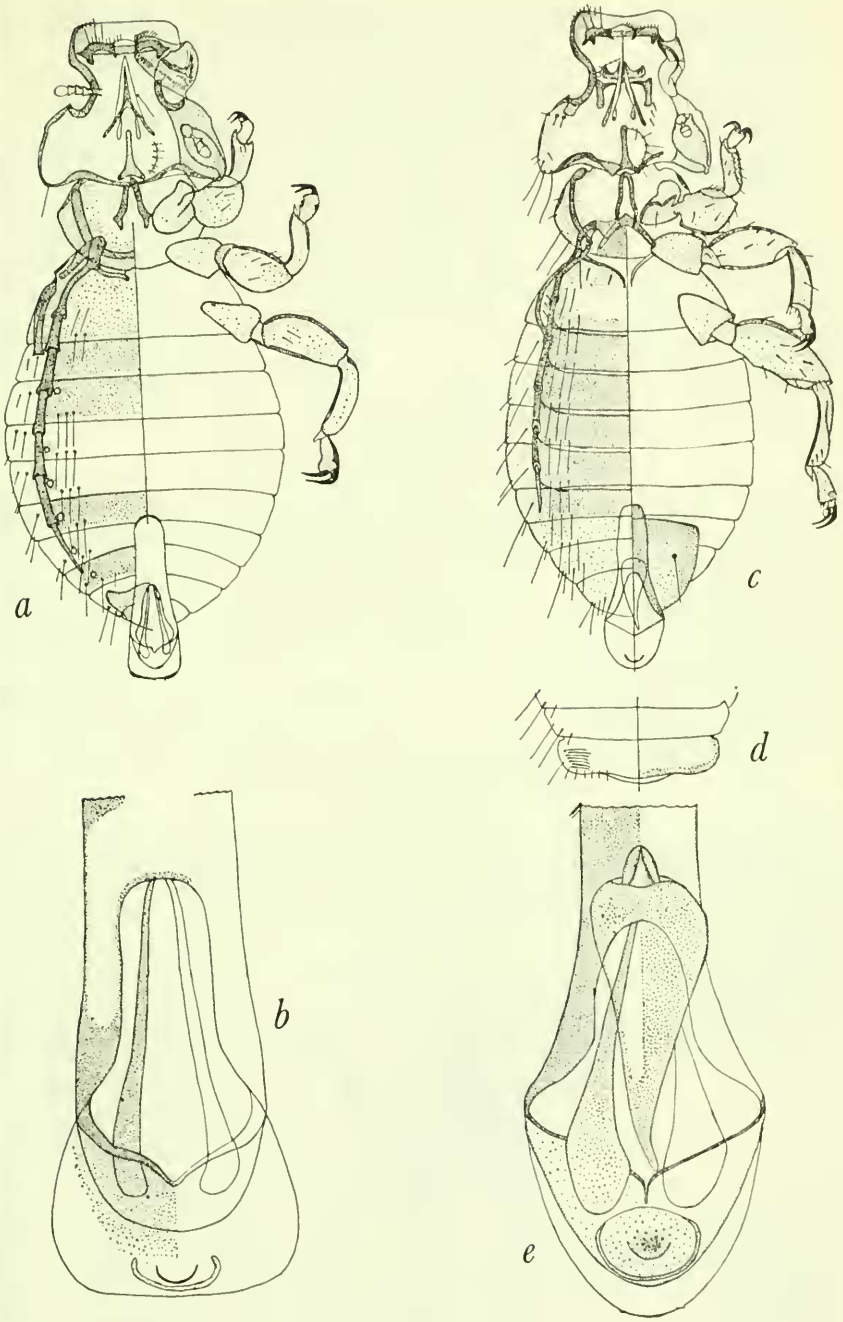

FIGURE 4.—*a–b*, *Trochiloecetes latitemporis* ♂: *a*, entire body; *b*, genitalia. *c–e*, *T. coartatia*: *c*, ♂, entire body; *d*, ♀, tip of abdomen; *e*, ♂, genitalia.

The measurements (in mm.) of *T. simplex* and *T. latitemporis* are as follows:

	T. simplex				*T. latitemporis*		
	Male		*Female*		*Male*		
	Length	*Width*	*Length*	*Width*	*Length*	*Width*	
Body	1. 74	--	2. 75	--	0. 17	--	
Head frons	--	0. 33	--	0. 37	--	0. 33	
Head temples	. 49	. 53	. 54	. 58	. 48	. 55	
Head occiput	. 48	--	. 53	--	. 47	--	
Prothorax	. 26	. 39	. 32	. 47	. 28	. 43	
Pterothorax	. 28	. 71	. 33	. 80	. 30	. 65	
Abdomen	. 85	. 85	1. 28	. 93	. 84	. 79	
Basal plate	. 29	. 10			. 35	. 09	(distal end)
Parameres	. 10	. 16			. 10	. 16	
Endomeral sac	. 10	. 17			. 15	. 11	

***Trochiloecetes coartatia*, new species**

FIGURE 4,*c–e*

Types, male and female adults, from *Ocreatus u. underwoodi* (Lesson); ♂ holotype collected by the author at La Bodega, Dep. Antioquia, Colombia, June 13, 1951; the ♀ allotype at Las Ventanas, Dep. Norte de Santander, Colombia, Sept. 21, 1916; ♂ USNM 64883 and ♀ in the collection of the author. Species represented by the types only.

Measurements follows the next species. See the key for distinguishing features.

***Trochiloecetes malvasae*, new species**

FIGURE 5,*a–b*

Type, male adult, from *Coeligena lutetiae* (De Lattre and Bourcier), collected by the author at Malvasá, Dep. Cauca, Colombia, Jan. 24, 1957, in the collection of the author. Represented by ♂ holotype, only.

Distinguished by unusually broad concave frons (0.37) and pitchy black color of certain head markings.

The measurements (in mm.) for *T. coartatia* and *T. malvasae* are as follows:

	T. coartatia				*T. malvasae*	
	Male		*Female*		*Male*	
	Length	*Width*	*Length*	*Width*	*Length*	*Width*
Body	1. 72	--	1. 82	--	1. 78	--
Head frons	--	0. 30	--	0. 34	--	0. 37
Head temples	. 46	. 50	. 48	. 56	. 50	. 55
Head occiput	. 47	--	. 49	--	. 50	--
Prothorax	. 26	. 41	. 32	. 46	. 29	. 43
Pterothorax	. 32	. 50	. 29	. 66	. 35	. 78
Abdomen	. 83	. 72	1. 00	. 79	. 84	. 75
Basal plate	. 35	. 09			. 42	. 08
Parameres	--	--			. 12	. 16
Endomeral sac	. 12	. 17			. 12	. 16

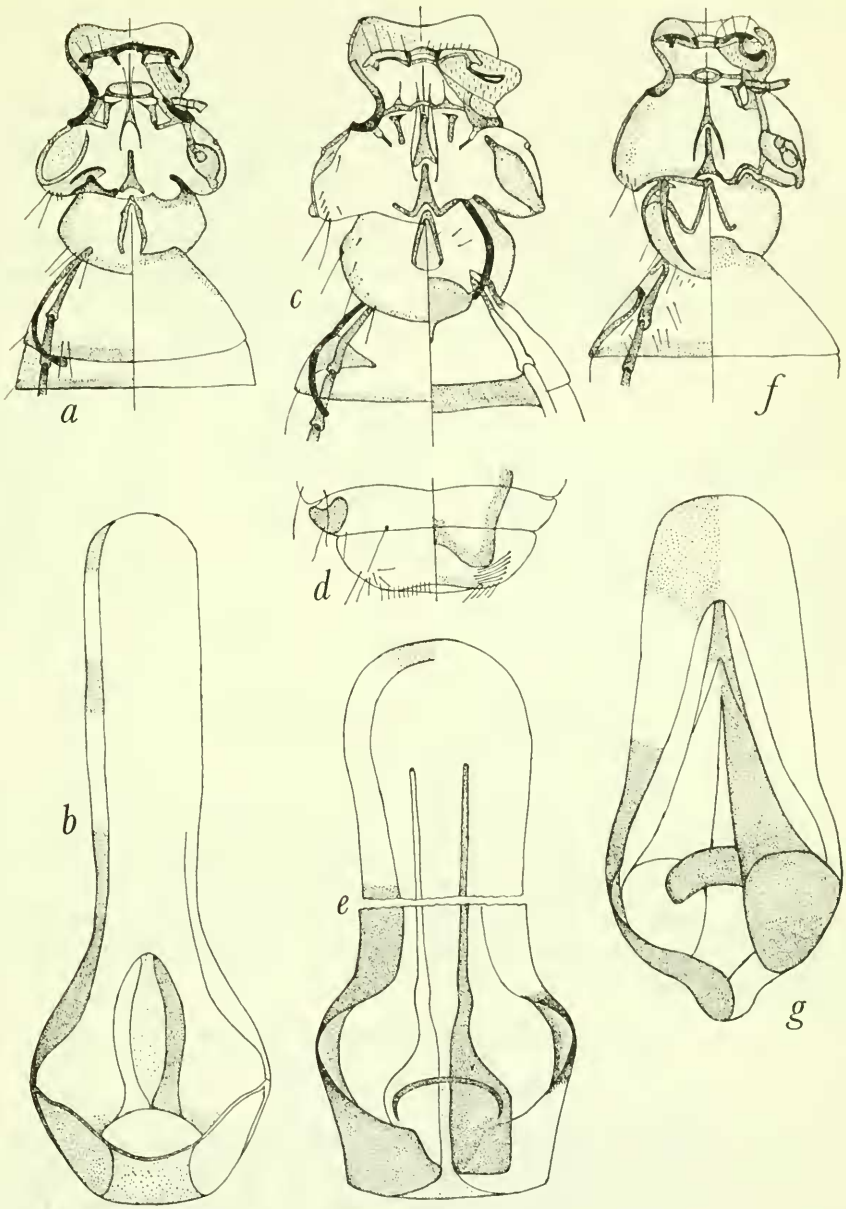

FIGURE 5.—*a–b*, *Trochiloecetes malvasae* ♂: *a*, head, thorax, and abdominal segment I; *b*, genitalia. *c–e*, *T. grandior:* *c*, ♀, head and thorax; *d*, ♀, three apical segments of abdomen; *e*, ♂, genitalia. *f–g*, *T. rhodopis* ♂: *f*, head and thorax; *g*, genitalia.

***Trochiloecetes grandior*, new species**

FIGURE 5,*c–e*

Types, male and female adults, from *Phaethornis guy corcuscus* Bangs collected by the author on the Volcán Turrialba, Costa Rica, April 1903, in the collection of the author. Species represented by the ♀ holotype, ♂ allotype, and 2 ♀ paratypes.

Distinguished by large size, wide frons, large prothorax extending far under head, and by pitchy-black submarginal carinae of prothorax.

The measurements (in mm.) for *T. grandior* are as follows:

	T. grandior			
	Male		*Female*	
	Length	*Width*	*Length*	*Width*
Body	1. 95	--	2. 23	--
Head: frons	--	0. 39	--	0. 43
Head: temples	. 52	. 61	. 55	. 67
Head: occiput	. 54	--	. 56	--
Prothorax	. 37	. 48	. 35	. 52
Pterothorax	. 22	. 50	. 26	. 59
Abdomen	1. 00	. 93	1. 28	. 96
Basal plate	. 35	. 13		
Parameres	. 11	. 28		
Endomeral sac	. 13	. 26		

***Trochiloecetes rhodopis*, new species**

FIGURE 5,*f–g*

Type, male adult, from *Rhodopis v. vesper* (Lesson), collected by the author at Huáncano, Dep. Ica, Peru, Mar. 6, 1921, in the collection of the author. Species represented by ♂ holotype only.

Distinguished by large size, narrow, slightly concave frons with rounded sides, and small thoracic segments. Measurements follow the next species.

***Trochiloecetes columbianus*, new species**

FIGURE 6,*a–c*

Types, male and female adults, from *Heliothrix barroti* (Bourcier). Female holotype collected by the author at Río Esmeralda, upper Río Sinú, May 12, 1949 and male allotype by author at Simití, Dep. Bolívar, Colombia, Apr. 11, 1947, USNM 64884. Represented by the ♀ holotype, ♂ allotype, 1 ♂ and 2 ♀ paratypes from Rio Esmeraldas, and 1 ♀ from type host taken at El Tambo, Dep. Chocó, Colombia, Apr. 1, 1918.

Species distinguished by numerous short, spinelike setae on head, pterothorax, and legs; also large size (♂=2.27).

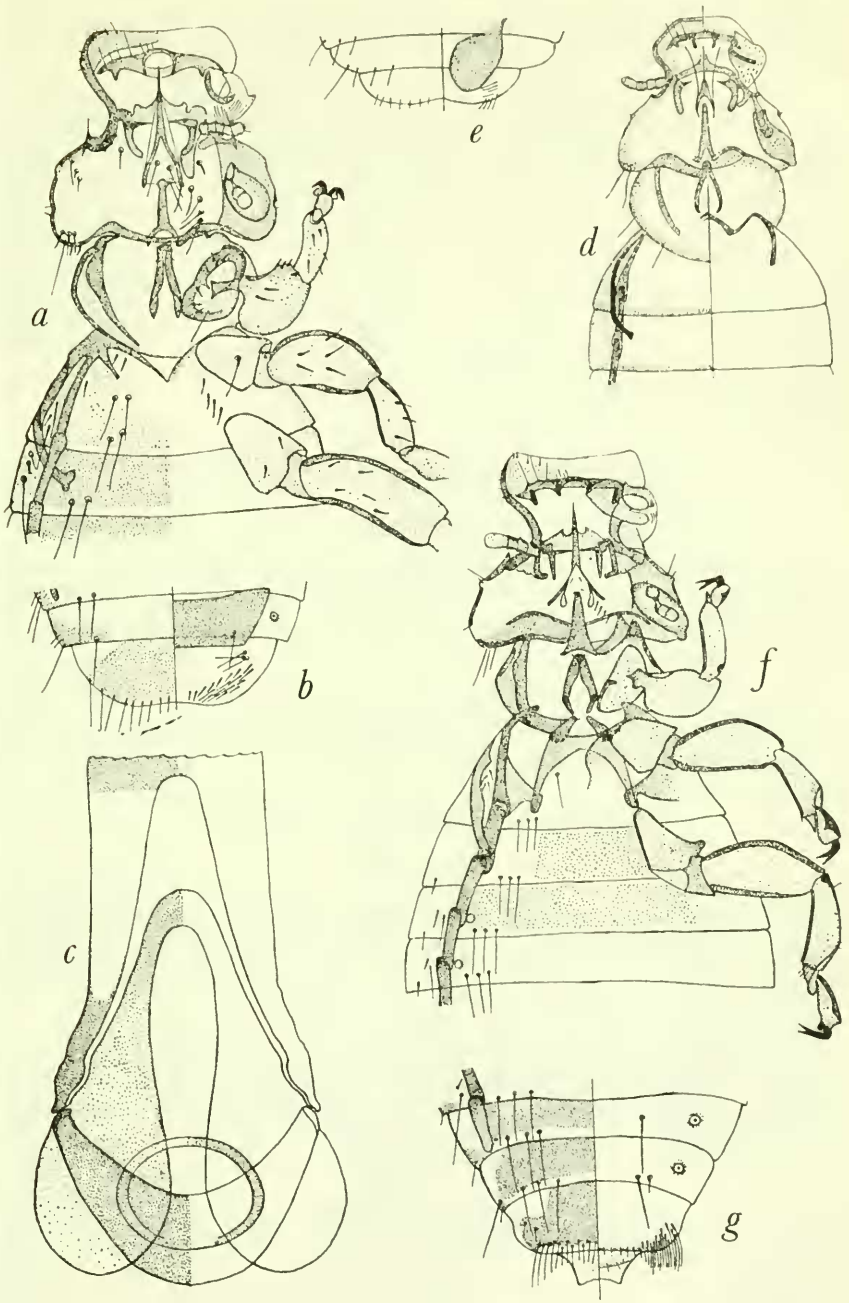

FIGURE 6.—*a–c*, *T. columbianus:* *a*, ♀, head, thorax, legs, and abdominal segment I; *b*, ♀, apical segments of abdomen; *c*, ♂, genitalia. *d–e*, *T. angustifrons* ♀: *d*, head, thorax, and abdominal segment I; *e*, apical segments of abdomen. *f–g*, *T. abdominalis* ♀: *f*, head, thorax, legs, and abdominal segments I–III; *g*, apical segments of abdomen.

The measurements (in mm.) for *T. rhodopis* and *T. columbianus* are as follows:

	T. rhodopis		*T. columbianus*			
	Male		*Male*		*Female*	
	Length	*Width*	*Length*	*Width*	*Length*	*Width*
Body	1. 98	--	2. 27	--	2. 53	--
Head (frons)	--	0. 33	--	0. 43	--	0. 41
Head (temples)	. 49	. 55	. 60	. 65	. 57	. 65
Head (occiput)	. 49	--	. 59	--	. 57	--
Prothorax	. 29	. 43	. 35	. 50	. 36	. 50
Pterothorax	. 35	. 78	. 41	. 82	. 35	. 78
Abdomen	1. 08	. 87	1. 17	. 98	1. 55	1. 17
Basal plate	. 24	. 11 (distal)	. 41	. 14 (distal)		
Parameres	. 09	. 16	. 12	. 21		
Endomeral sac	. 13	. 16	. 13	. 19		

***Trochiloecetes angustifrons*, new species**

FIGURE 6,*d–e*

Type, female adult, from *Thalurania furcata colombica* (Bourcier), collected by the author at Hacienda, Las Vegas, Dep. Magdalena, Colombia, May 18, 1913, in the collection of the author. Represented by the ♀ holotype only.

Distinguished by small size, very narrow, transverse frons, with strongly divergent sides; sucking apparatus with thickened basal portion and very slender stylet. Measurements follow the next species.

***Trochiloecetes abdominalis*, new species**

FIGURE 6,*f–g*

Type, female adult, from *Florisuga m. mellivora* (Linné), collected by the author at Bellavista, Dep. Norte de Santander, Colombia, July 10, 1943, in the collection of the author. Known from the ♀ holotype only.

Distinguished by concave frons and sides bluntly angulated—prothorax not extending under occiput—and by very large abdomen.

The measurements (in mm.) for *T. angustifrons* and *T. abdominalis* are as follows:

	T. angustifrons		*T. abdominalis*	
	Female		*Female*	
	Length	*Width*	*Length*	*Width*
Body	1. 90	--	2. 19	--
Head (frons)	--	0. 29	--	0. 29
Head (temples)	. 46	. 53	. 54	. 63
Head (occiput)	. 48	--	. 53	--
Prothorax	. 29	. 46	. 33	. 48
Pterothorax	. 30	. 72	. 32	. 82
Abdomen	1. 06	. 83	1. 19	1. 06

***Trochiloecetes pinguis*, new species**

FIGURE 7,*a*

Type, female adult, from *Chalybura buffoni micans* Bangs and Barbour, collected by the author at Socarré, upper Río Sinú, Colombia, Mar. 31, 1949, USNM 64885. Represented by the ♀ holotype only.

Characterized by the concave frons, with strongly rounded sides; sinuate occipital margin and very slender sucking apparatus, with propulsion sclerite short and thickened. Measurements follow the next species.

***Trochiloecetes complexus*, new species**

FIGURE 7,*b–c*

Type, female adult, from *Glaucis hirsuta affinis* Lawrence, collected by the author at Sapasóa, Dep. San Martin, Peru, Nov. 1, 1933, in the collection of the author. Known from ♀ holotype only.

Recognized by the narrow, transverse frons (0.32); frontal area uniformly colored; sucking apparatus long and very slender; and no sternal gular setae.

The measurements (in mm.) for *T. pinguis* and *T. complexus* are as follows:

	T. pinguis		*T. complexus*	
	Female		*Female*	
	Length	*Width*	*Length*	*Width*
Body	2. 14	--	2. 16	--
Head: frons	--	0. 42	--	0. 33
Head: temples	. 57	. 63	. 47	. 58
Head: occiput	. 58	--	. 50	--
Prothorax	. 37	. 52	. 30	. 46
Pterothorax	. 37	. 72	. 35	. 73
Abdomen	1. 08	1. 04	1. 13	. 91

***Trochiloecetes bolivianus*, new species**

FIGURE 7,*d–e*

Type, female adult, from *Ocreatus underwoodi addae* (Bourcier), collected by the author at Calabatéa, Dep. La Paz, Bolivia, Nov. 10, 1934, in the collection of the author. Known from ♀ holotype only.

Characterized by narrow, transverse frons (0.32) uniformly colored; temples narrow (0.54); and prothorax extending far under occiput. Measurements follow the next species.

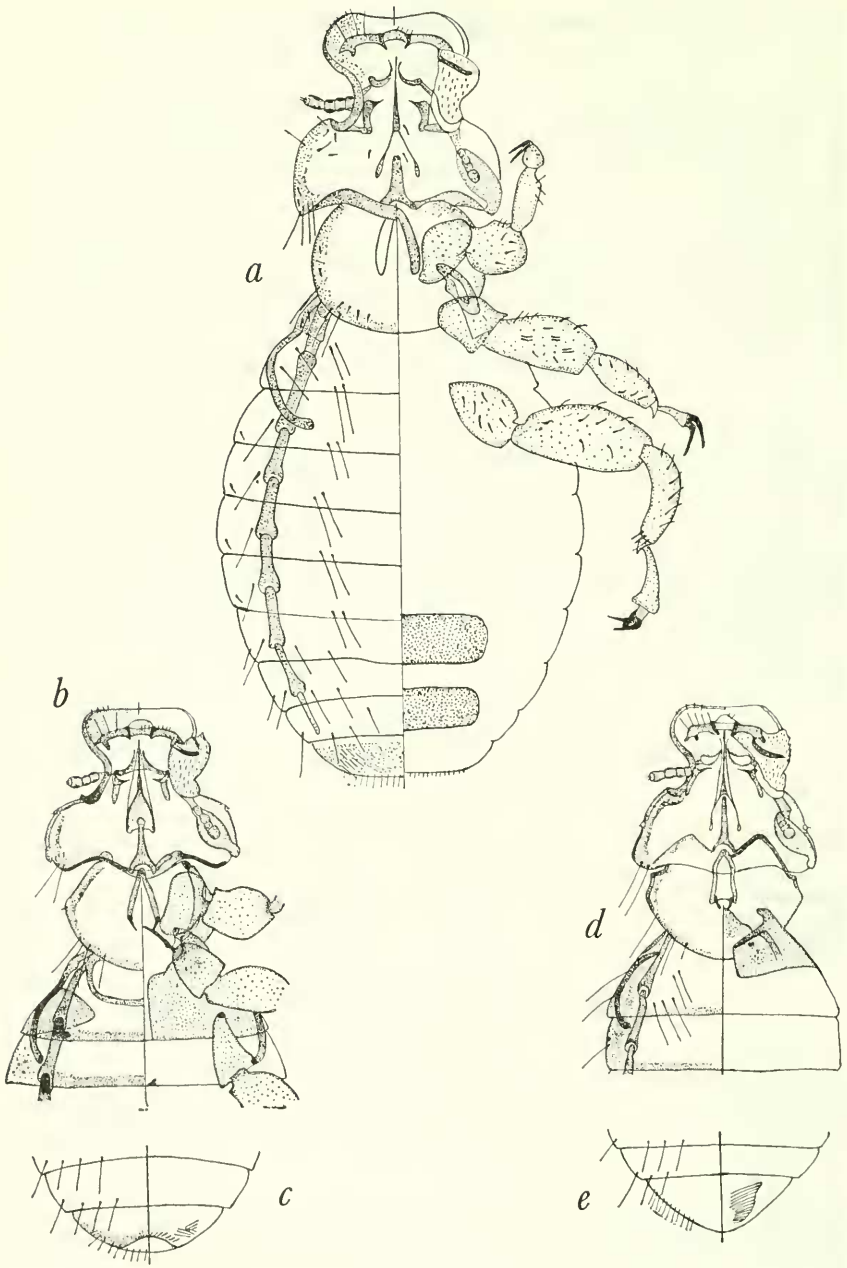

FIGURE 7.—*a*, *Trochiloecetes pinguis* ♀, complete body. *b–c*, *T. complexus* ♀: *b*, head, thorax, portion of legs, and abdominal segment I; *c*, apical segments of abdomen. *d–e*, *T. bolivianus* ♀: *d*, head, thorax, and first abdominal segment; *e*, apical segments of abdomen.

***Trochiloecetes fasciatus*, new species**

FIGURE 8,*a–c*

Type, female adult, from *Lesbia nuna pallidiventris* (Simon), collected by the author at Cajabamba, Dep. Cajabamba, Peru, Apr. 22, 1933, in the collection of the author. Known from ♀ holotype only.

Frons transverse and uniformly colored; frons wider (0.34 to 0.35); sucking apparatus short and heavy; 4 to 5 short setae on each side of gular area; heavy, deeply colored temporal carinae, curving backward from near eye almost to prosternum.

The measurements (in mm.) for *T. bolivianus* and *T. fasciatus* are as follows:

	T. bolivianus		*T. fasciatus*	
	Female		*Female*	
	Length	*Width*	*Length*	*Width*
Body	2. 08	--	2. 25	--
Head: frons	--	0. 32	--	0. 35
Head: temples	. 47	. 54	. 50	. 58
Head: occiput	. 48	--	. 49	--
Prothorax	. 33	. 46	. 33	. 47
Pterothorax	. 30	. 67	. 33	. 78
Abdomen	1. 16	. 82	1. 40	. 98

***Trochiloecetes oenonae*, new species**

FIGURE 8,*d–e*

Type, female adult, from *Chrysuronia oenona longirostris* Berlepsch, collected by the author at Convención, Dep. Norte de Santander, Colombia, Jan. 20, 1943, in the collection of the author. Known from a single ♀ the holotype.

Similar in many ways to *fasciatus*, but without temporal carinae, merely marginal carinae, broken by eye. Measurements follow *T. illumani*.

***Trochiloecetes multicarinae*, new species**

FIGURE 8,*f–g*

Type, female adult, from *Boissoneaua f. flavescens* (Loddiges), collected by the author at Buenos Aires, Dep. Norte de Santander, Colombia, Oct. 2, 1946, in the collection of the author. Known from a single ♀, the holotype.

Distinguished by large size (2.54); frons deeply concave, uniformly colored and with rounded sides; 5 setae on each side of gular area; transverse, frontal carinae wide and deeply colored; heavy, deeply colored marginal and submarginal carinae on thoracic segments. Measurements follow the next species.

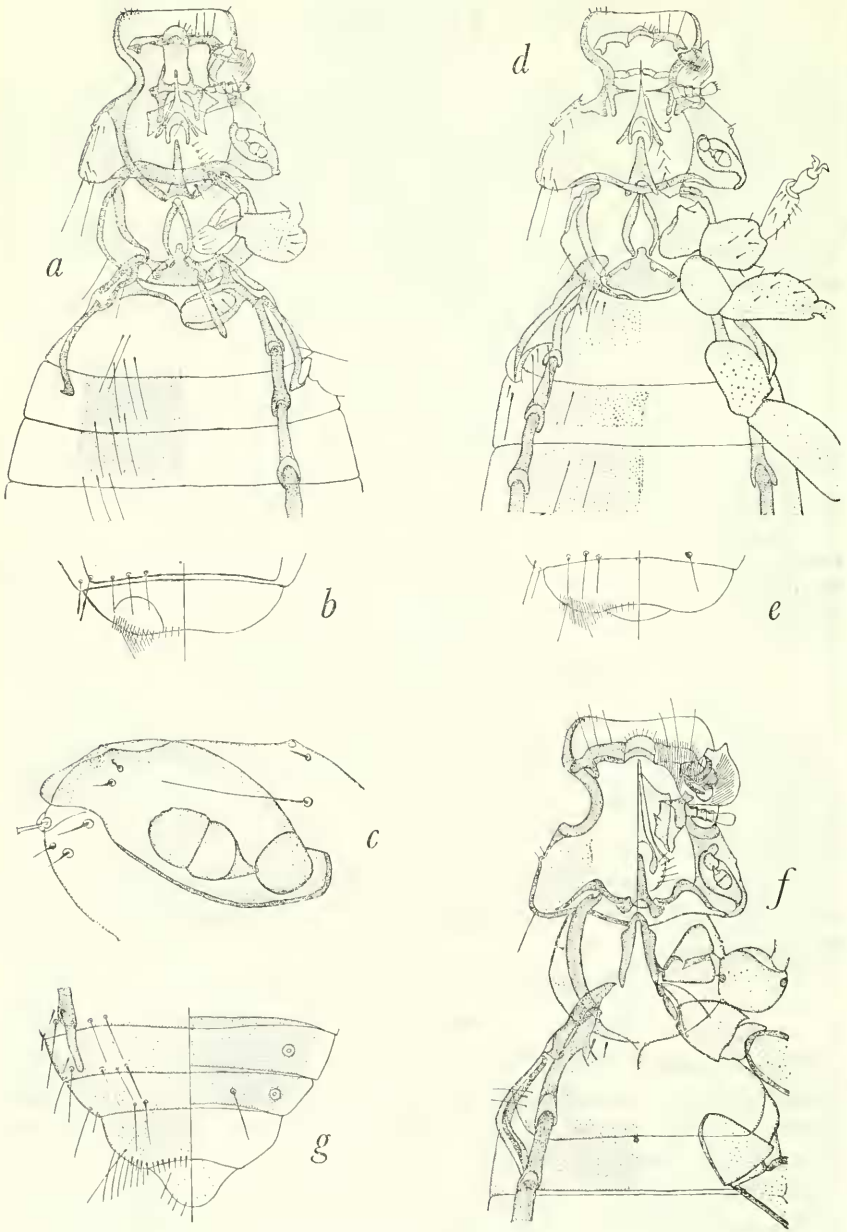

FIGURE 8.—*a–c*, *Trochiloeectes fasciatus* ♀ : *a*, head, thorax, and adbominal segments I–II; *b*, apical segments of abdomen; *c*, antennary fossa, with antennae. *d–e*, *T. oenonae* ♀ : *d*, head, thorax, legs, and abdominal segments I–II; *e*, apical segments of abdomen. *f–g*, *T. multicarinae* ♀ : *f*, head, thorax, portion of legs, and abdominal segment I; *g*, apical four segments of abdomen.

***Trochiloecetes illumani*, new species**

FIGURE 9,*a–b*

Type, female adult, from *Pterophanes cyanoptera peruvianus* Boucard, collected by the author at Hichulóma, Dep. La Paz, Bolivia, Dec. 30, 1934, in the collection of the author. Represented by the ♀ holotype and 1 ♀ paratype.

Slightly smaller than previous species, with head shorter and wider (0.55 × 0.65); transverse frontal carina slender and composed of two narrow bands; joints of abdominal carinae much swollen; carinae of thorax slenderer.

The measurements (in mm.) for *T. oenonae*, *T. multicarinae*, and *T. illumani* are as follows:

	T. oenonae		*T. multicarinae*		*T. illumani*	
	Female		*Female*		*Female*	
	Length	*Width*	*Length*	*Width*	*Length*	*Width*
Body	2. 18	--	2. 54	--	2. 44	--
Head: frons	--	0. 33	--	0. 44	--	0. 43
Head: temples	. 51	. 60	. 59	. 63	. 55	. 65
Head: occiput	. 54	--	. 61	--	. 54	--
Prothorax	. 33	. 47	. 40	. 52	. 36	. 54
Pterothorax	. 38	. 78	. 40	. 82	. 43	. 76
Abdomen	1. 20	1. 05	1. 41	1. 02	1. 31	. 95

***Trochiloecetes sauli*, new species**

FIGURE 9,*c–d*

Type, female adult, from *Lafresnaya l. lafresnayi* (Boissoneau), collected by the author at Tijeras, Moscopán, Dep. Cauca, Colombia, Mar. 8, 1954, in the collection of the author. Known from ♀ holotype only.

Frons very slightly concave, with rounded sides; frontal area uniformaly colored; margins of temples irregular; size large (2.57); a heavy, submarginal, strongly sinuate carina across occiput; sucking apparatus very heavy, with short, slender tip. Measurements follow the next species.

***Trochiloecetes mandibularis*, new species**

FIGURE 9,*e–f*

Type, female adult, from *Threnetes leucurus rufigastra* Cory, collected by the author at Sapasóa, Dep. San Martin, Peru, Nov. 4, 1933, in the collection of the author. Species represented by the ♀ holotype only.

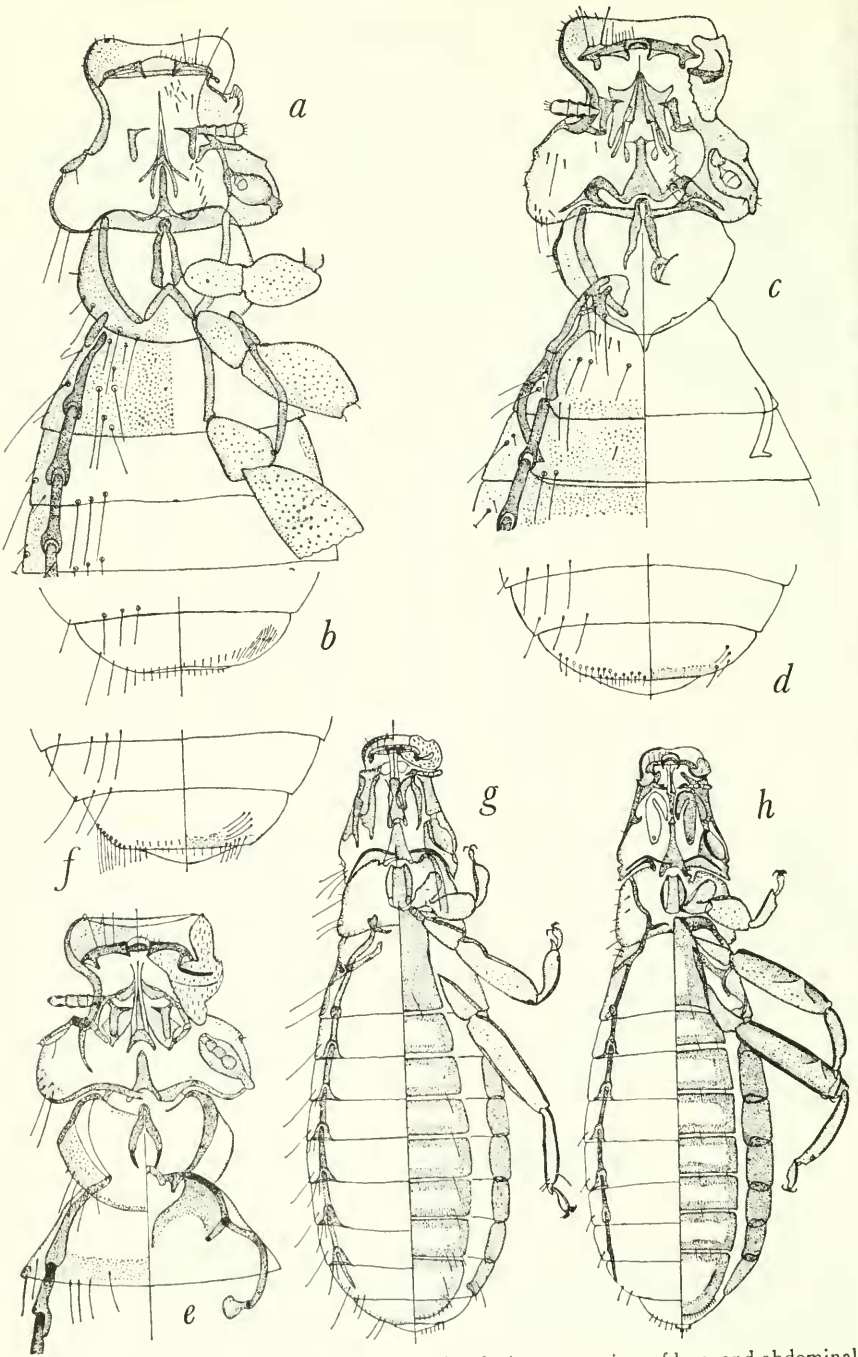

FIGURE 9.—*a–b*, *Trochiloecetes illumani* ♀ : *a*, head, thorax, portion of legs, and abdominal segments I–II; *b*, apical segments of abdomen. *c–d*, *T. sauli* ♀ : *c*, head, thorax, and abdominal segments I–II; *d*, apical three segments of abdomen. *e–f*, *T. mandibularis* ♀ : *e*, head and thorax; *f*, apical three segments of abdomen. *g*, *Trochiliphagus lazulus* ♀ , entire body. *h*, *T. mexicanus* ♀ , entire body.

Similar to *sauli* but differs from it in having a concave, submarginal line across frons; head short and wide, 0.53×0.64; frons 0.42; temples strongly expanded laterally with line of margin broken at prominent eye; sucking apparatus heavy basally, with thickened basal prongs; propulsion sclerite short and thickened.

The measurements (in mm.) for *T. sauli* and *T. mandibularis* are as follows:

	T. sauli		*T. mandibularis*	
	Female		*Female*	
	Length	*Width*	*Length*	*Width*
Body	2. 57	--	2. 37	--
Head: frons	--	0. 46	--	0. 42
Head: temples	. 60	. 67	. 53	. 64
Head: occiput	. 59	--	. 52	--
Prothorax	. 40	. 50	. 33	. 51
Pterothorax	. 41	. 78	. 35	. 72
Abdomen	1. 40	1. 15	1. 37	1. 04

Trochiliphagus, new genus

Type species: *Trochiliphagus lazulus*, new species.

Diagnosis: Similar to certain species of *Ricinus* in general shape and structure of the head, thorax, and abdomen, but with the same type of sucking mouth parts as in *Trochiloeeetes*. The mandibles, instead of being L-shaped, as in *Trochiloeeetes*, consist of minute, tapering sclerites, often of irregular shape and with the distal end varying between a point and a rounded tip. Their bases are attached to the inner edge of the premarginal carinae, the attachment apparently being flexible (see figs. 1*f* and 2).

The sucking apparatus is smaller than in *Trochiloeeetes* and with certain differences in structure clearly illustrated in figure 1, *a* and *f*. There is a generic conformity in the general shape of the head and in the absence of darker markings, following the type of *Ricinus microcephalum* Kellogg, except that the head is longer and usually narrower at the temples.

The thoracic and abdominal structure is similiar to the genus *Ricinus*. I have two males of this genus from *Selasphorus flammula*, the same individual host from which was taken the type of *Trochiloecetes doratophorus*. These genitalia are very similiar to those of *Trochiloecetes columbianus*, and not at all like those of *Ricinus*, of which I have examined numerous specimens, and of which a figure is presented (see fig. 12*c–e*).

The labral lobes are always well developed, often enormously expanded, curving forward to the line of the frons. Even those of lesser development protrude noticeably beyond the lateral margins of the head.

Key to the species of *Trochiliphagus*

Body length less than 2.80 . . . . . Section A
Body length not less than 3.00 or more than 3.40 . . . . . Section B
Body length more than 3.50 . . . . . Section C

SECTION A

Body length 2.57; head 0.63×0.64; frons 0.29 (female). Frons uniformly circular; transverse, frontal, and preantennary carinae narrow; propulsion sclerite of sucking apparatus long and narrow; gular setae very long; sides of prothorax straight; submarginal, abdominal carinae narrow, with small articulations; pleurites very wide, extending considerably beyond spiracles . . . **irazuensis**

SECTION B

a. Frons uniformly rounded, with or without a slight median emargination.
b. Frons with a slight, median emargination. Body 3.29; head 0.78×0.65; frons 0.38. Sides of prothorax straight; abdomen slender (1.08); submarginal, abdominal carinae narrow, with prominent articulations; pleurites wide and strongly pigmented . . . . . **mexicanus**
b′. Frons without median emargination; gular setae well developed, 5 to 6.
c. Head wide, both at frons (0.37) and temples (0.68); prothorax with prominent, rounded anterlateral angles, bearing a spine and 1 long seta, and with concave sides; preantennary carinae with a branch extending backward from median portion to antennary fossae. **grandior**
c′. Head narrow, frons 0.32; temples 0.63; prothorax without anterior angles and without setae except in posterolateral portion, and with sides convex and undulating; preantennary carinae without branch to antennary fossae, but they bend inward in anterior portion to base of mandibles . . . . . **peruanus**
a′. Frons flatly convex, or transverse with two slight protuberances; pterothorax with concave sides and definite anterior angles.
b. Frons flatly convex.
c. Head small (0.69×0.60; frons 0.34); sides of prothorax undulating; pleurites wide, with submarginal carinae in their median portion. **jimenezi**
c′. Head large (0.76×0.63; frons 0.37); sides of prothorax straight; pleurites very narrow, not reaching to submarginal carinae; basal propulsion sclerite of sucking apparatus short and thick . . . . . **mellivorus**
b′. Frons transverse (a slight protuberance) in center of lateral half; frontal, transverse carina wide, deeply and uniformly colored; sides of prothorax undulating; pleurites very wide, extending inward beyond spiracles. **brevicephalus**

SECTION C

a. Frons uniformly rounded. Size smaller (body 3.56; head 0.80×0.67; frons 0.37); sides of prothorax slightly concave; pterothorax constricted, slightly forward of middle; pleurites extending inward only to inner edge of submarginal carinae . . . . . **lazulus**
a′. Frons uniformly rounded. Size large, body 3.75 to 3.80; head 0.73 to 0.80 in width at temples.

b. Head large (0.89×0.80; frons 0.40); sides of prothorax undulating; pleurites extending beyond inner margin of abdominal carinae; anterior sclerite of sucking apparatus, bearing stylet, very short and without basal prongs; abdomen narrow (1.17) . . . . . **latitemporalis**

b'. Head narrow (0.90×0.73; frons 0.39); sides of prothorax slightly concave, as wide as temples; pleurites narrow, not reaching to submarginal carinae; anterior sclerite of sucking apparatus long and slender, with well developed basal prongs; abdomen very wide (1.52) . **abdominalis**

***Trochiliphagus lazulus*, new species**

FIGURE 9,*g*

Type, female adult, from *Campylopterus falcatus* (Swainson), collected by the author at La Africa, Sierra Perijá, Colombia, June 8, 1942, USNM 64886. Represented by the ♀ holotype and 4 ♀ paratypes (type is the right-hand specimen on slide containing 2 ♀).

Measurements follow the next species.

***Trochiliphagus mexicanus*, new species**

FIGURE 9,*h*

Type, female adult, from *Phaethornis superciliosus veracrucis* Ridgway, collected by the author at Cerro Tuxtla, Veracruz, Mexico, May 10, 1940, USNM 64887. Represented by the ♀ holotype, 1 adult ♀ paratype, and 1 nymph paratype.

The measurements (in mm.) for *T. lazulus* and *T. mexicanus* are as follows:

	T. lazulus		*T. mexicanus*	
	Female		*Female*	
	Length	*Width*	*Length*	*Width*
Body	3. 56	--	3. 29	--
Head, frons	--	0. 37	--	0. 38
Head, temples	. 80	. 67	. 78	. 65
Head, occiput	. 71	--	. 68	--
Prothorax	. 52	. 72	. 49	. 68
Pterothorax	. 61	. 92	. 59	. 90
Abdomen	1. 74	1. 17	1. 80	1. 09

***Trochiliphagus mellivorus*, new species**

FIGURE 10,*a*

Type, female adult, from *Florisuga mellivora* (Linné), collected by the author at Huanay, Río Bópi, Bolivia, Aug. 13, 1934, in the collection of the author. Represented by the ♀ holotype only.

Diagnosis: Frons flatly convex; sides of prothorax straight; pleurites very narrow, not reaching to submarginal carinae; basal propulsion sclerite of sucking apparatus short and thick. Measurements follow the next species.

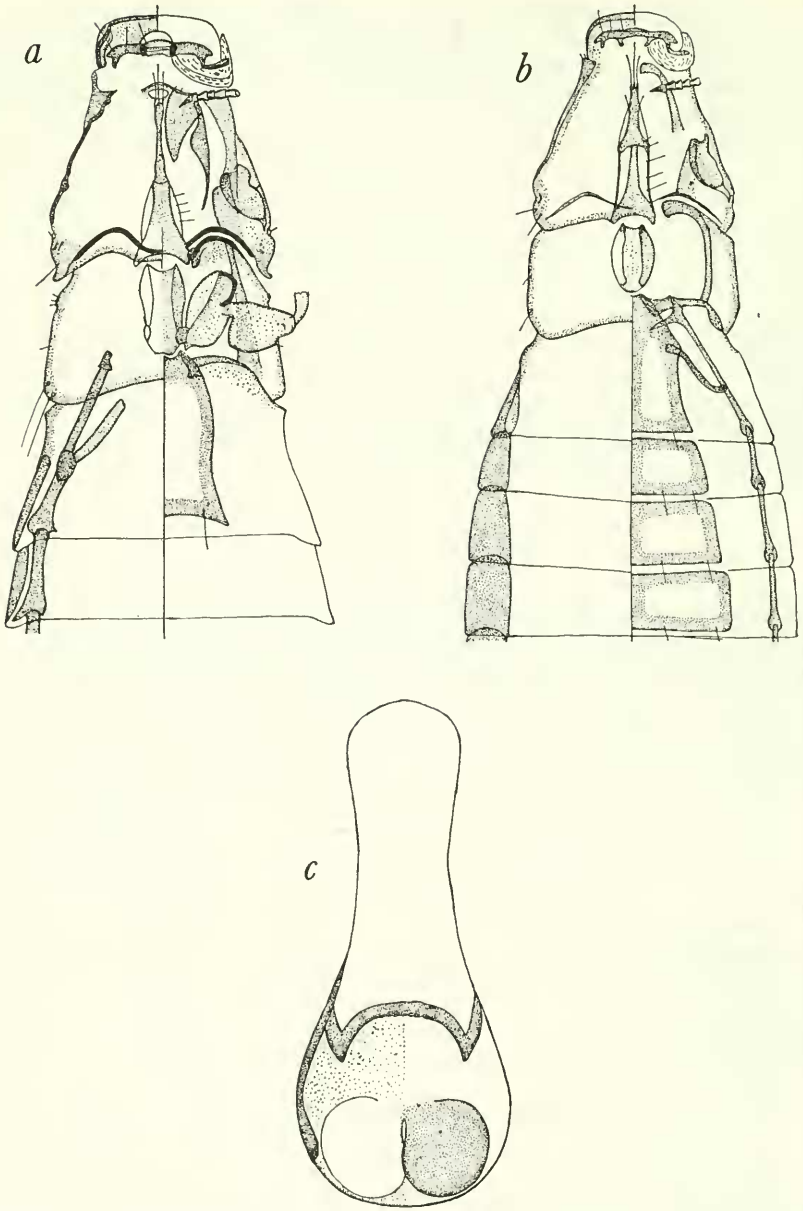

FIGURE 10.—*a*, *Trochiliphagus melliworus* ♀, head, thorax, 1st segment of abdomen, and 1st leg. *b–c*, *T. irazuensis*: *b*, ♀, head, thorax, and abdominal segments I–III; *c*, ♂, genitalia.

***Trochiliphagus irazuensis*, new species**

FIGURE 10,*b-c*

Types, male and female adults, from *Selasphorus flammula* Salvin, collected by the author on Volcán Irazú, Costa Rica, February 1902, in the collection of the author. Species represented by ♀ holotype, ♂ allotype, and ♂ paratype.

Diagnosis: Recognized by its small size (length 2.57, ♀); frons uniformly circular; cephalic carinae narrow; propulsion sclerite of sucking apparatus long and narrow; sides of prothorax straight; abdominal carinae narrow and pleurites very wide and deeply pigmented.

The measurements (in mm.) for *T. mellivorus* and *T. irazuensis* are as follows:

	T. mellivorus		*T. irazuensis*			
	Female		*Male*		*Female*	
	Length	*Width*	*Length*	*Width*	*Length*	*Width*
Body	3. 21	--	2. 36	--	2. 57	--
Head: frons	--	0. 37	--	0. 28	--	0. 29
Head: temples	. 76	. 63	. 62	. 56	. 63	. 64
Head: occiput	. 71	--	. 59	--	. 58	--
Prothorax	. 50	. 68	. 42	. 55	. 46	. 62
Pterothorax	. 58	. 89	. 41	. 70	. 43	. 81
Abdomen	1. 76	1. 04	1. 21	. 78	1. 39	. 96
Basal plate			. 28	. 09 (distal end)		
Endomeral sac			. 14	. 14		

***Trochiliphagus grandior*, new species**

FIGURE 11,*a*

Type, female adult, from *Boissonneaua f. flavescens* (Loddiges) collected by the author at Buenos Aires, Dep. Norte de Santander, Colombia, Sept. 14, 1946, in the collection of the author. Species represented by ♀ holotype and 2 ♀ paratypes.

Diagnosis: Frons uniformly rounded; head wide, both at frons (0.37) and temples (0.68); prothorax with prominent, rounded anterolateral angles, bearing a spine and 1 long seta, and with concave sides; preantennary carinae with a branch extending backward from median portion to antennary fossae. Measurements follow the next species.

***Trochiliphagus brevicephalus*, new species**

FIGURE 11,*b*

Type, female adult, from *Phaethornis a. augusti* (Bourcier), collected by the author at Ocaña, Norte de Santander, Colombia, Nov. 3, 1946, in the collection of the author. Represented by the ♀ holotype only.

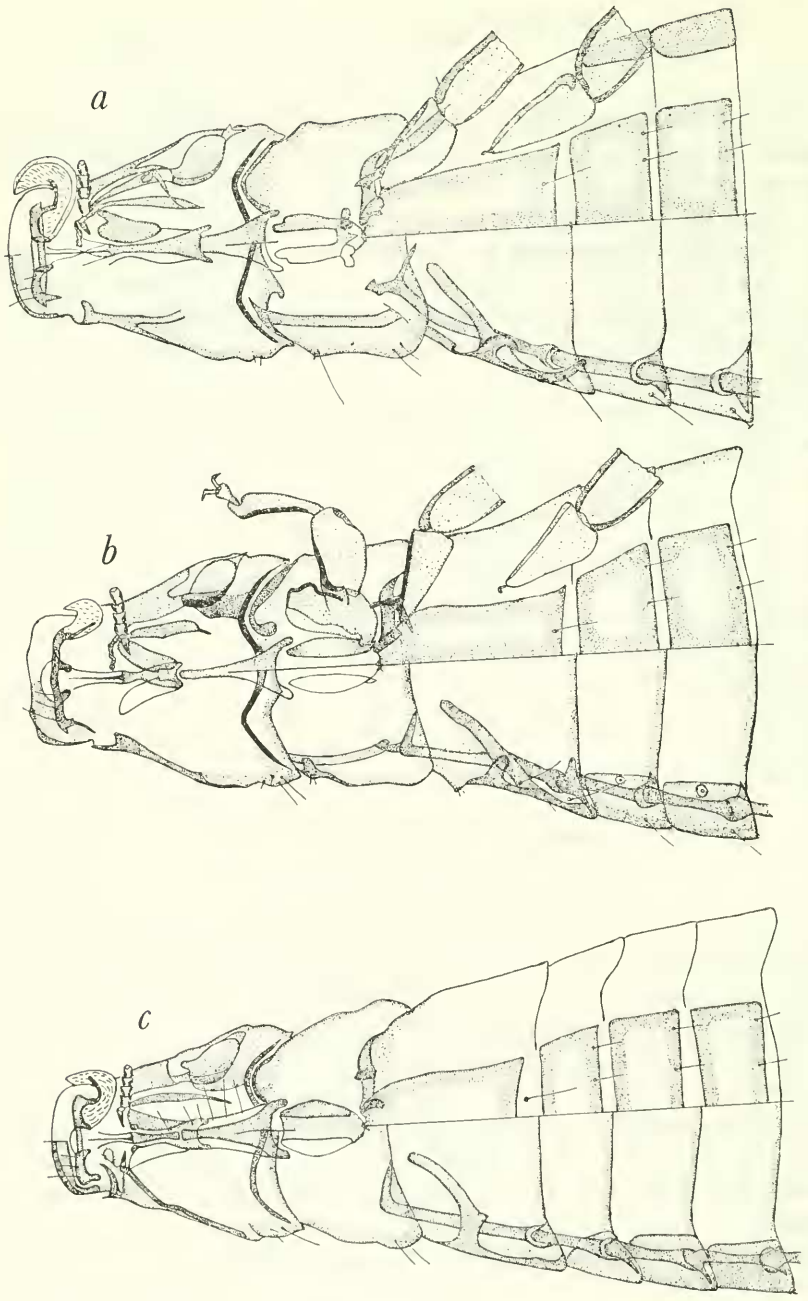

FIGURE 11.—*a*, *Trochiliphagus grandior* ♀, head, thorax, and abdominal segments I–II. *b*, *T. brevicephalus* ♀, head, thorax, and abdominal segments I–II. *c*, *T. peruanus* ♀, head, thorax, and abdominal segments I–III.

Diagnosis: Frons transverse, with two slight, median protuberances; frontal, transverse carinae wide and deeply and uniformly colored; sides of prothorax undulating; pleurites very wide, extending inward beyond spiracles.

The measurements (in mm.) for *T. grandior* and *T. brevicephalus* are as follows:

	T. grandior		*T. brevicephalus*	
	Female		Female	
	Length	Width	Length	Width
Body	3. 40	--	3. 33	--
Head: frons	--	0. 37	--	0. 38
Head: temples	. 82	. 68	. 77	. 67
Head: occiput	. 75	--	. 72	--
Prothorax	. 46	. 70	. 54	. 67
Pterothorax	. 65	1. 00	. 61	. 96
Abdomen	1. 76	1. 22	1. 81	1. 17

***Trochiliphagus jimenezi* (Carriker), 1903**

Physostomum jimenezi Carriker, Univ. Nebraska Studies, vol. 3, p. 163, pl. 5, fig. 1, 1903. Host: *Amazilia t. tzacatl* (Delallave), Juan Viñas, Costa Rica, March 1902.

Represented by the ♀ holotype and 1 ♀ paratype, in the collection of the author.

Diagnosis: Frons flatly convex; pterothorax with concave sides and definite anterior angles; head small (0.76×0.63; frons 0.37); sides of prothorax undulating; pleurites wide, with submarginal carinae across their median portion. Measurements follow the next species.

***Trochiliphagus peruanus*, new species**

FIGURE 11,*c*

Type, female adult, from *Adelomyia melanogenys inornata* (Gould), collected by the author at Santo Domingo, Peru, June 30, 1931, in the collection of the author. Known from the ♀ holotype only.

Diagnosis: Frons uniformly rounded; gular setae well developed (5–6); head rather narrow, frons 0.32; temples 0.63; prothorax without anterior angles and with undulating, convex sides; anterior portion of preantennary carinae bent inward to join base of mandibles.

The measurements (in mm.) for *T. jimenezi* and *T. peruanus* are as follows:

	T. jimenezi		*T. peruanus*	
	Female		Female	
	Length	Width	Length	Width
Body	3. 00	--	3. 03	--
Head: frons	--	0. 34	--	0. 32
Head: temples	. 69	. 60	. 71	. 63
Head: occiput	. 65	--	. 69	--
Prothorax	. 45	. 63	. 48	. 72
Pterothorax	. 55	. 78	. 59	. 91
Abdomen	1. 65	. 90	1. 62	1. 13

***Trochiliphagus latitemporalis*, new species**

FIGURE 12,*a*

Type, female adult, from *Eutoxeres aquila munda* Griscom, collected by the author at Rio Jurubidá, Dep. Chocó, Colombia, Mar. 28, 1951, USNM 64888. Represented by the ♀ holotype only.

Diagnosis: Size large (body 3.75; head 0.89×0.80; frons 0.40); frons uniformly rounded; sides of prothorax undulating; pleurites extending beyond inner edge of abdominal carinae; anterior sclerite of sucking apparatus, bearing stylet, very short and without basal prongs; abdomen narrow (1.17). Measurements follow the next species.

***Trochiliphagus abdominalis*, new species**

FIGURE 12,*b*

Type, female adult, from *Anthrocothorax nigricollis iridescens* (Gould), collected by the author at Villa Felisa, Norte de Santander Colombia, Oct. 22, 1947, in the collection of the author. Known from ♀ holotype only.

Diagnosis: Frons uniformly rounded; size large (length 3.80; head 0.90×0.73); sides of prothorax slightly concave, same width as temples; pleurites narrow, not reaching to submarginal carinae; anterior sclerite of sucking apparatus long and slender, with well-developed basal prongs; abdomen very wide (1.52).

The measurements (in mm.) for *T. latitemporalis* and *T. abdominalis* are as follows:

	T. latitemporalis		*T. abdominalis*	
	Female		*Female*	
	Length	*Width*	*Length*	*Width*
Body	3. 75	--	3. 80	--
Head: frons	--	0. 40	--	0. 39
Head: temples	. 89	. 80	. 90	. 73
Head: occiput	. 82	--	. 83	--
Prothorax	. 54	. 76	. 54	. 76
Pterothorax	. 61	. 96	. 56	1. 22
Abdomen	2. 10	1. 17	2. 00	1. 52

***Trochiliphagus* (?) *ochoterenai* (Zavaleta), 1943**

Trochiloecetes ochoterenai Zavaleta, Tesis Univ. Mexico Fac. Cien., Dep. Biol., p. 54, pl. 5, fig. c, 1943. Host: *Selasphorus rufus* (Gmelin).

I have examined two females of a *Trochiliphagus* from *Selasphorus rufus* from the collection of Col. Emerson. One is fully adult, the other slightly immature. They are extremely close to *T. irazuensis* (Carriker), from *S. flammula*, the actual differences being too small to merit nomenclatural recognition.

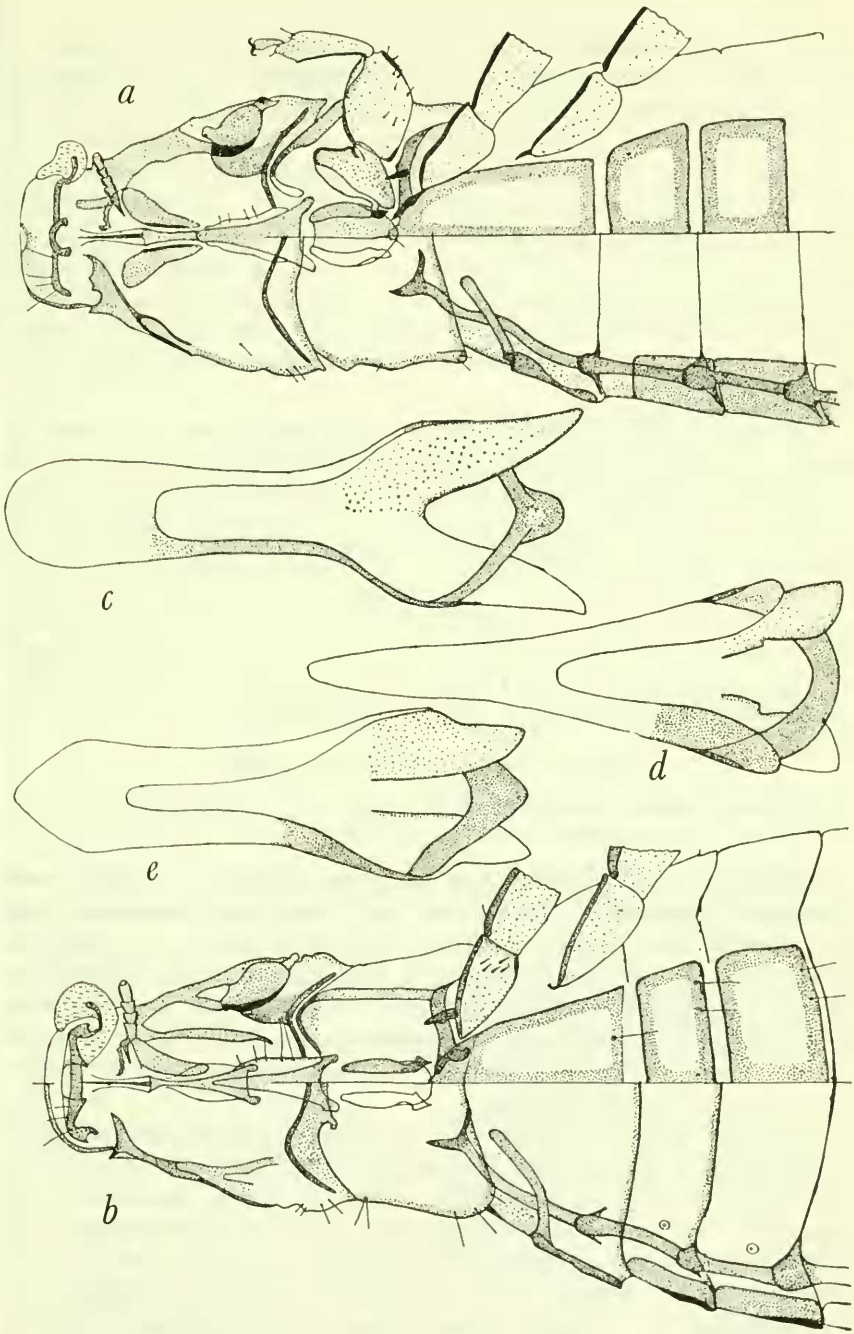

FIGURE 12.—*a*, *Trochiliphagus latitemporalis* ♀ , head, thorax, legs, and abdominal segments I–II. *b*, *T. abdominalis* ♀ ,head thorax, portion of legs, and abdominal segments I–II. *c–e*, Genitalia from *Ricinus* species: *c*, *R. leptosomus* (Carriker); *d*, not described from *Synallaxis albescens australis*, Bolivia; *e*, not described from *Elaenia o. obscura*, Peru.

Body length 2.54 against 2.57; head (temples) 0.62×0.58 against 0.63×0.64; frons 0.29 against 0.29; prothorax 0.40×0.58 against 0.36×0.62; pterothorax 0.43×0.78 against 0.43×0.80; abdomen 1.32×0.91 against 1.39×0.95. There are but two differences of any importance—viz, width of head at temples (0.58 against 0.64) and the prothorax, which is longer and narrower. The details of the sucking apparatus are not clearly defined either in the type of *irazuensis* or in the specimens from *S. rufus*, but those visible seem to be identical, as well as the transverse, frontal carina, the pleurites, and the submarginal abdominal carinae. The two hosts are closely related, and it would serve no useful purpose to attempt their separation.

The uncertainty surrounding the generic position of *T. ochoterenai* makes it impossible for me to allocate that species generically. I have not been able to see a copy of the description, and while the species was placed under *Trochiloecetes* in the 1952 "Checklist of Genera and Species of Mallophaga" (Hopkins and Clay); there is some doubt of its correctness. If it is actually a *Trochiloecetes*, it may well be a synonym of *T. doratophorum* (Carriker), from *Selasphorus flammula*, since the species of *Trochiliphagus* from these two hosts are practically the same. If it is a *Trochiliphagus*, it would then probably be a synonym of *T. irazuensis* (Carriker)

***Physostomum lineatum* Osborn, 1896**

Physostomum lineatum Osborn, Bull. U.S. Bur. Ent., n.s., p. 248, 1896. Host: *Trochilus colubris* Linné.

This species was placed under the genus *Ricinus* in Hopkins' and Clay's 1952 checklist. Dr. Osborn says that three specimens were sent to him for identification from Cornell University. I communicated with Dr. Dietrich, Curator of Entomology of the Museum of Zoology at Cornell, and he informed me that he has not been able to find any of Osborn's types described in the 1896 paper, and has no idea where they may be located. Osborn stated that the specimens had been returned to Cornell.

A careful scrutiny of Osborn's description of this species shows that it could not have been a *Trochiloecetes* and that it was either a *Trochiliphagus* or else a true *Ricinus*, with a wrongly labelled host. He says: "Front rounded, with a few short hairs; palettes small; lateral angles of temples produced; prothorax widening a little behind and posterior margin concave." None of these characters would apply to *Trochiloecetes*. I suggest that it was a *Trochiliphagus*, since no mention was made of any darker markings on the sides of the head, a common character in many species of *Ricinus*.

Hosts and Parasites Treated in this Paper

Hosts:	Parasites:
Calypte costae (Bourcier):	*Trochiloeeetes prominens* (Kellogg and Chapman)
Selasphorus flammula Salvin:	*Trochiloeeetes doratophorus* (Carriker)
	Trochiliphagus irazuensis new species
Thalurania (furcata) furcatoides Gould:	*Trochiloeeetes emiliae* Paine and Mann
Selasphorus rufus (Gmelin):	*Trochiloeeetes ochoterenai* Zavaleta
Aglaiactis cupripennis (Bourcier):	*Trochiloeeetes aglaiacti* new species
Amazilia t. tzactl (de la LLave):	*Trochiloeeetes quibdoensis* new species
	Trochiliphagus jimenezi (Carriker)
Amazilia amazilia caeruleigularis Carriker:	*Trochiloeeetes simplex* new species
Colibri c. coruscans (Gould):	*Trochiloeeetes latitemporis* new species
Ocreatus u. underwoodi (Lesson):	*Trochiloeeetes coartatia* new species
Ocreatus underwoodi addae (Burcier):	*Trochiloeeetes bolivianus* new species
Coeligena lutetiae (de Lattre and Bourcier):	*Trochiloeeetes malvasae* new species
Phaethornis guy coruscus Bangs:	*Trochiloeeetes grandior* new species
Phaethornis superciliosus veracrucis Ridgway:	*Trochiliphagus mexicanus* new species
Phaethornis a. augusti (Bourcier):	*Trochiliphagus brevicephalus* new species
Rhodopis v. vesper (Lesson):	*Trochiloeeetes rhodopis* new species
Heliothrix barroti (Bourcier):	*Trochiloeeetes columbianus* new species
Thalurania furcata colombica (Bourcier):	*Trochiloeeetes angustifrons* new species
Florisuga mellivora (Linné):	*Trochiloeeetes abdominalis* new species
	Trochiliphagus mellivorus new species
Chalybura buffoni micans Bangs and Barbour:	*Trochiloeeetes pinguis* new species
Glaucis hirsuta affinis Lawrence:	*Trochiloeeetes complexus* new species
Lesbia nuna pallidiventris (Simon):	*Trochiloeeetes fasciatus* new species
Chrysuronia oenona longirostris Berlepsch:	*Trochiloeeetes oenonae* new species
Boissonneaua f. flavescens (Loddiges):	*Trochiloeeetes multicarinae* new species
	Trochiliphagus grandior new species
Pterophanes cyanoptera peruvianus Boucard:	*Trochiloeeetes illumani* new species
Lafresnaya l. lafresnayi (Boisson):	*Trochiloeeetes sauli* new species
Threnetes leucurus rufigaster Cory:	*Trochiloeeetes mandibularis* new species
Campylopterus falcatus (Swainson):	*Trochiliphagus lazulus* new species
Adelomyia melanogenia inornata (Gould):	*Trochiliphagus peruanus* new species
Eutoxeres aquila munda Griscom:	*Trochiliphagus latitemporalis* new species
Anthrocothorax nigricollis irridescens (Gould):	*Trochiliphagus abdominalis* new species
Trochilus colubris Linne:	*Trochiliphagus lineatus* (Osborn)

In the author's collection but not included in this paper are specimens of *Trochiloecetes* from the following list of hosts (it would be impossible to illustrate some of them with any degree of accuracy because of their poor condition):

Acestrura heliodor astreans Bangs, ♀, Hacienda, Cincinnati, Magdalena, Colombia.
Aglaiocercus emmae caudata (Berlepsch), ♀, La Palmita, Dep. Norte de Santander, Colombia.
Aglaiocercus kingi mocoa (DeLattre and Bourcier), ♀, Belén Dep., Huila, Colombia.
Amazilia fimbriata apicalis (Gould), ♀♀ ♀ ♀, San Felix, Río Orinoco, Venezuela.
Amazilia fimbriata nigricauda (Elliot), ♀, Todos Santos, Bolivia.
Amazilia lactea bartletti (Gould), ♀, Perené, Chanchamayo, Peru.
Amazilia tobaci caurensis (Berlepsch and Hartert), ♀ ♀, Ciudad Bolívar, Venezuela.
Archilochus colubris (Linné), ♀, Volcán Irazú, Costa Rica.

This specimen could not possibly represent *Physostomum lineatum* Osborn, from the same host. It is a typical *Trochiloecetes*, but is not in sufficiently good condition to be described and figured.

Calliphlox amethystina (Boddaert), ♀, San German, Venezuela.
Chalybura melanorrhoa (Salvin), ♀ ♀, El Hogar, Costa Rica.
Chrysuronia oenone josephinae (Bourcier and Mulsant), ♀, Calabatea, La Paz, Bolivia.
Damophila julie julie (Bourcier), ♀, Volador, Dep. Bolívar, Colombia.
Haplophaedia a. aureliae (Bourcier and Mulsant), ♀ ♀ ♀, Belén, Dep. Huila, Colombia.
Haplophoedia aureliae caucensis (Simon), ♀, Frontino, Dep. Antioquia, Colombia.
Lepidopyga l. luminosa (Lawrence), ♀, La Raya, Río Cauca, Colombia.
Leucippus fallax cervina (Gould), ♀, Nazaret, La Goajíra, Colombia.
Metallura theresiae Simon, ♀, Atuen, Peru.
Polyonomus caroli (Bourcier), ♀, Yanac, Peru.
Talaphorus taczanawskii (Sclater), ♀ ♀, Yuramarca, Peru.
Thalurania furcata fannyi (DeLattre and Bourcier), ♀ ♀, Andagóya, Chocó, Colombia.
Thalurania furcata jelskii Taczanowski, ♀, Chiñiri, Río Beni, Bolivia.

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